

The crustal structure of the Ojin-Rise Seamounts, North Pacific.

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Ojin-Rise Seamounts is located between Shatsky Rise and Emperor Seamount Chain. The main portion of Shatsky Rise was formed by impact of the mantle plume head after 148 Ma (Nakanishi et al., 1999). Shatsky Rise consists of three plateau, TAMU, ORI, and Shirshov massifs. The radiometric ages of drilling samples of the three massifs are about 144 Ma for TAMU, 134 Ma for ORI, and about 128 Ma for Shirshov, respectively (Geldmacher et al., 2014; Heaton and Koppers, 2014). The seafloor age around Orin Rise Seamounts is estimated to be 134-125 Ma (Nakanishi et al., 1999). The geophysical measurements (bathymetry, gravity and geomagnetism) and rock sample sampling were conducted in 2014 summer (R/V KAIREI cruise, KR14-07). We therefore present the crustal structure of the Ojin-Rise Seamounts based on the analysis of bathymetric and gravity data.

We use multibeam bathymetric data obtained in KR14-07 and bathymetric grid data reported by Sager et al. (1999) and free-air gravity anomaly data by Sandwell and Smith (2009). We have estimated the oceanic crustal thickness using the method by Kuo and Forsyth (1988) and the state of isostasy and effective elastic thickness using the admittance analysis by McKenzie and Bowin (1976).

Our result shows that the crustal thickness beneath the Ojin-Rise Seamounts is about 12 km, which is two-times thicker than the normal oceanic crustal (e.g., 6 km). The effective elastic thickness is calculated to be about 2.6 km. The state of isostasy is Airy type. We conclude that the Ojin-Rise Seamounts was formed near the spreading ridge about 134-125 Ma. The timing of the formation is close to that of Shirshov Massif, implying that the same volcanic activity might form both Shirshov Massif and Ojin-Rise Seamounts.

Keywords: Ojin-Rise Seamounts, Shatsky Rise, admittance analysis, gravity, bathymetry feature